

Claims

We claim:

1. An electronics component assembly in a tire comprising:
 - a tire;
 - a mounting member incorporated in the tire, including means for securing an antenna thereto;
 - at least a first antenna wire incorporated in the tire and connected to the mounting member; and
 - an integrated circuit carried by the mounting member and in communication with the first antenna wire.
2. The electronics component assembly of claim 1, wherein the mounting member is a small outline package.
3. The electronics component assembly of claim 2, further comprising:
 - a second antenna wire incorporated in said tire and connected to the small outline package; and
 - wherein said means for securing comprises a first and second retaining groove, the first antenna wire is at least partially retained by the first retaining groove, and the second antenna wire is at least partially retained by the second retaining groove.
4. The electronics component assembly of claim 3, wherein the small outline package has a longitudinal axis, and wherein the first and second retaining grooves are perpendicular to the longitudinal axis of the small outline package.
5. The electronics component assembly of claim 3, wherein the small outline package has a longitudinal axis, and wherein the first and second retaining grooves are parallel to the longitudinal axis of the small outline package.
6. The electronics component assembly of claim 1, wherein the mounting member is a printed circuit board.

7. The electronics component assembly of claim 6, further comprising a second antenna wire incorporated in the tire and connected to the printed circuit board.

8. The electronics component assembly of claim 7, wherein the printed circuit board has a longitudinal axis, and wherein a length of the end of the first antenna wire is connected to the printed circuit board and is oriented perpendicular to the longitudinal axis, and wherein a length of the end of the second antenna wire is connected to the printed circuit board and is oriented perpendicular to the longitudinal axis.

9. The electronics component assembly of claim 7, wherein said means for securing comprises a first and second antenna receiving aperture, wherein an end of the first antenna wire is hooked shaped and is received by the first antenna receiving aperture, and wherein an end of the second antenna wire is hooked shaped and is received by the second antenna receiving aperture.

10. The electronics component assembly of claim 9, wherein the first and second antenna wires are further connected to the printed circuit board by a connection selected from the group consisting of soldering, welding, and crimping.

11. The electronics component assembly of claim 7, wherein the printed circuit board has a longitudinal axis, and wherein a length of the end of the first antenna wire is connected to the printed circuit board and is oriented parallel to the longitudinal axis, and wherein a length of the end of the second antenna wire is connected to the printed circuit board and is oriented parallel to the longitudinal axis.

12. The electronics component assembly of claim 6, wherein said means for securing an antenna wire is a connection selected from the group consisting of soldering, welding, and crimping.

13. The electronics component assembly of claim 6, wherein the first antenna wire is in communication with the integrated circuit through a soldering connection.

14. The electronics component assembly of claim 1, wherein the mounting member has a first side and a second side, the first side opposite from the second side, and wherein said means

for securing comprises a first antenna wire receiving aperture extending from the first side of the mounting member to the second side of the mounting member, and wherein an end of the first antenna wire is received in the first antenna wire receiving aperture.

15. The electronics component assembly of claim 14, wherein the end of the first antenna wire extends from the first side of the mounting member through the first antenna wire receiving aperture and to the second side of the mounting member.

16. The electronics component assembly of claim 15, wherein the end of the first antenna wire is further connected to the first and second sides of the mounting member by a connection selected from the group consisting of soldering, welding, and crimping.

17. The electronics component assembly of claim 14, wherein the mounting member is selected from the group consisting of a printed circuit board and a small outline package.

18. The electronics component assembly of claim 14, wherein the first antenna wire has a main body in the shape selected from the group consisting of serpentine, helical, and saw tooth.

19. The electronics component assembly of claim 14, further comprising a second antenna wire incorporated in the tire;

wherein said means for securing further comprises a second antenna wire receiving aperture extending from the first side of the mounting member to the second side of the mounting member; and

wherein an end of the second antenna wire is received in the second antenna wire receiving aperture.

20. The electronics component assembly of claim 1, further comprising a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into communication with the integrated circuit.

21. The electronics component assembly of claim 20, further comprising:

a second antenna wire incorporated in the tire and connected to the mounting member;
and

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into communication with the integrated circuit.

22. The electronics component assembly of claim 1, wherein said means for securing an antenna wire comprises a first bonded connection through which the first antenna wire is placed into communication with the integrated circuit.

23. The electronics component assembly of claim 22, wherein the first bonded connection is a soldered connection.

24. The electronics component assembly of claim 23, further comprising a second antenna wire incorporated in the tire and connected to the mounting member, wherein said means for securing further comprises a second bonded connection through which the second antenna wire is placed into communication with the integrated circuit, and wherein the second bonded connection is a soldered connection.

25. An electronics component assembly in a tire, comprising:

- a tire;

- a mounting member incorporated in the tire, the mounting member having a first side and a second side, the first side opposite from the second side;

- a first antenna wire securely attached to the mounting member, the first antenna wire incorporated in the tire;

- a second antenna wire securely attached to the mounting member, the second antenna wire incorporated in the tire;

- an integrated circuit carried by the mounting member;

- a first communication connection configured for placing the first antenna wire into communication with the integrated circuit; and

- a second communication connection configured for placing the second antenna wire into communication with the integrated circuit.

26. The electronics component assembly of claim 25, wherein the mounting member is a small outline package.

27. The electronics component assembly of claim 26, wherein the small outline package has a first and second retaining groove, wherein the first antenna wire is at least partially retained by the first retaining groove, and wherein the second antenna wire is at least partially retained by the second retaining groove.

28. The electronics component assembly of claim 25, wherein the mounting member is a printed circuit board.

29. The electronics component assembly of claim 25, wherein the mounting member has a longitudinal axis, wherein a length of the end of the first antenna wire is securely attached to the mounting member and is oriented perpendicular to the longitudinal axis, and wherein a length of the end of the second antenna wire is securely attached to the mounting member and is oriented perpendicular to the longitudinal axis.

30. The electronics component assembly of claim 25, wherein the first and second antenna wires are securely attached to the mounting member by a secure attachment selected from the group consisting of soldering, welding, and crimping.

31. The electronics component assembly of claim 25, wherein the mounting member has a first antenna wire receiving aperture extending from the first side of the mounting member to the second side of the mounting member, wherein the mounting member has a second antenna wire receiving aperture extending from the first side of the mounting member to the second side of the mounting member, wherein an end of the first antenna wire is received by the first antenna wire receiving aperture, and wherein an end of the second antenna wire is received by the second antenna wire receiving aperture.

32. The electronics component assembly of claim 25, wherein the first communication connection is a first mounting member wire connected to the first antenna wire and the integrated circuit, and wherein the second communication connection is a second mounting member wire connected to the second antenna wire and the integrated circuit.

33. The electronics component assembly of claim 25, wherein the first communication connection is a first bonded connection wherein the first antenna wire is bonded to the integrated circuit; and

wherein the second communication connection is a second bonded connection wherein the second antenna wire is bonded to the integrated circuit.

34. The electronics component assembly of claim 33, wherein the first and second bonded connections are soldered connections.

35. An electronics component assembly in a tire, comprising:

a tire;

a printed circuited board incorporated in the tire, the printed circuit board having a first side and a second side, the first side opposite from the second side, the printed circuit board having a first antenna wire receiving aperture extending from the first side of the printed circuit board to the second side of the printed circuit board, and the printed circuit board having a second antenna wire receiving aperture extending from the first side of the printed circuit board to the second side of the printed circuit board;

a first antenna wire having an end and a bend, the bend in the first antenna wire received by the first antenna wire receiving aperture, and the end of the first antenna wire extending from the first side of the printed circuit board through the first antenna wire receiving aperture and to the second side of the printed circuit board;

a second antenna wire having an end and a bend, the bend of the second antenna wire received by the second antenna wire receiving aperture, and the end of the second antenna wire extending from the first side of the printed circuit board through the second antenna wire receiving aperture and to the second side of the printed circuit board;

an integrated circuit carried by the mounting member;

a first mounting member wire connected to the first antenna wire and the integrated circuit configured for placing the first antenna wire into communication with the integrated circuit; and

a second mounting member wire connected to the second antenna wire and the integrated circuit configured for placing the second antenna wire into communication with the integrated circuit.

36. An electronics component assembly in a tire comprising:

a mounting member incorporated in a tire and having a first retaining connection that is at least partially curved in shape;

a first antenna wire incorporated in the tire, and connected to the first retaining connection; and

an integrated circuit carried by the mounting member and in electrical communication with the first antenna wire.

37. The electronics component assembly of claim 36, wherein the mounting member includes a flat base, and wherein the first retaining connection includes a first pair of fingers that are semi-circular in shape and are attached to the base.

38. The electronics component assembly of claim 36, further comprising:

a second antenna wire incorporated in the tire; and

wherein the mounting member has a second retaining connection that is at least partially curved in shape, and wherein the second antenna wire is connected to the second retaining connection.

39. The electronics component assembly of claim 38, further comprising:

a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit; and

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into electrical communication with the integrated circuit; and wherein:

the mounting member includes a flat base and the integrated circuit is attached to the base;

the first retaining connection includes a first and third pair of fingers that are semi-circular in shape and are attached to the base and engage the first antenna wire to connect the first antenna wire to the mounting member; and

the second retaining connection includes a second and fourth pair of fingers that are semi-circular in shape and are attached to the base and engage the second antenna wire to connect the second antenna wire to the mounting member.

40. The electronics component assembly of claim 36, wherein the first antenna wire is connected to the first retaining connection by a connection selected from the group consisting of mechanical fasteners, welding, and adhesion.

41. The electronics component assembly of claim 36, wherein the mounting member has an axis and is generally tubular in shape, and wherein the first retaining connection includes a first angled portion that is a part of the wall of the mounting member that is angled towards the axis of the mounting member, and wherein the first antenna wire is connected to the mounting member through engagement with the first angled portion.

42. The electronics component assembly of claim 41, wherein the mounting member includes a first stop that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, and wherein the first antenna wire abuts against the first stop.

43. The electronics component assembly of claim 41, further comprising a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit; and
wherein the mounting member has a flat portion onto which the integrated circuit is mounted.

44. The electronics component assembly of claim 43, further comprising a cover that protects the integrated circuit and the first mounting member wire.

45. The electronics component assembly of claim 36, wherein:
the mounting member has an axis and is generally tubular in shape;
the first retaining connection includes a first angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the first antenna wire is connected to the mounting member through engagement with the first angled portion;
the second retaining connection includes a second angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the second antenna wire is connected to the mounting member through engagement with the second angled portion;
the mounting member includes a first stop that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the first antenna wire abuts against the first stop; and

the mounting member includes a second stop that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the second antenna wire abuts against the second stop.

46. The electronics component assembly of claim 45, wherein the first and second angled portions are at an angle of 45 degrees towards the axis of the mounting member, and wherein the first and second stops are at an angle of 90 degrees towards the axis of the mounting member.

47. The electronics component assembly of claim 38, wherein:

the mounting member has an axis and is generally tubular with a solid central section;

the first retaining connection includes a first angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the first antenna wire is connected to the mounting member through engagement with the first angled portion, the first antenna wire abuts against an end of the solid central section; and

the second retaining connection includes a second angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the second antenna wire is connected to the mounting member through engagement with the second angled portion, the second antenna wire abuts against an end of the solid central section.

48. The electronics component assembly of claim 47, further comprising:

a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit;

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into electrical communication with the integrated circuit; and

wherein the mounting member has a flat portion onto which the integrated circuit is mounted.

49. The electronics component assembly of claim 48, further comprising a cover that protects the integrated circuit, the first mounting member wire, and the second mounting member wire.

50. The electronics component assembly of claim 36, wherein:

the mounting member is in the shape of a generally solid cylinder;

the first retaining connection is a cylindrical cavity that has internal threads; and

the first antenna wire has external threads that are engageable with the internal threads of the first retaining connection to connect the first antenna wire to the mounting member.

51. The electronics component assembly of claim 38, wherein:

the mounting member is in the shape of a generally solid cylinder, the first retaining connection is a cylindrical cavity that has internal threads, the second retaining connection is a cylindrical cavity that has internal threads;

the first antenna wire has external threads that are engageable with the internal threads of the first retaining connection to connect the first antenna wire to the mounting member; and

the second antenna wire has external threads that are engageable with the internal threads of the second retaining connection to connect the second antenna wire to the mounting member.

52. The electronics component assembly of claim 51, further comprising:

a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit;

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into electrical communication with the integrated circuit; and

wherein the mounting member has a flat portion onto which the integrated circuit is mounted.

53. The electronics component assembly of claim 52, further comprising a cover that protects the integrated circuit, the first mounting member wire, and the second mounting member wire.

54. The electronics component assembly of claim 36, wherein:

the mounting member is in the shape of a generally solid cylinder, the first retaining connection is a cylindrical cavity that has an annular recess;

the first antenna wire has an annular projection engageable with the annular recess of the first retaining connection; and

the first retaining connection is urged around the first antenna wire to help connect the first antenna wire to the mounting member.

55. The electronics component assembly of claim 38, wherein:

the mounting member is in the shape of a generally solid cylinder, the first retaining connection is a cylindrical cavity that has an annular recess, the second retaining connection is a cylindrical cavity that has an annular recess;

the first antenna wire has an annular projection engageable with the annular recess of the first retaining connection;

the second antenna wire has an annular projection engageable with the annular recess of the second retaining connection;

the first retaining connection is urged around the first antenna wire to help connect the first antenna wire to the mounting member; and

the second retaining connection is urged around the second antenna wire to help connect the second antenna wire to the mounting member.

56. The electronics component assembly of claim 55, further comprising:

a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit;

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into electrical communication with the integrated circuit; and

wherein the mounting member has a flat portion onto which the integrated circuit is mounted.

57. The electronics component assembly of claim 56, further comprising a cover that protects the integrated circuit, the first mounting member wire, and the second mounting member wire.

58. An electronics component assembly in a tire comprising:

a tire;

a mounting member incorporated in the tire and having a first retaining connection that is at least partially cylindrical in shape, and a second retaining connection that is at least partially cylindrical in shape;

a first antenna wire incorporated in the tire and connected to the first retaining connection;

a second antenna wire incorporated in the tire and connected to the second retaining connection; and

an integrated circuit carried by the mounting member and in electrical communication with the first and second antenna wires.

59. The electronics component assembly of claim 58, wherein:

the mounting member includes a flat base, and the integrated circuit is attached to the base;

the first retaining connection includes a first pair of fingers that are semi-circular in shape and are attached to the base and engage the first antenna wire to connect the first antenna wire to the mounting member; and

the second retaining connection includes a second pair of fingers that are semi-circular in shape and are attached to the base and engage the second antenna wire to connect the second antenna wire to the mounting member.

60. The electronics component assembly of claim 58, wherein the first antenna wire is connected to the first retaining connection and the second antenna wire is connected to the second retaining connection by a connection selected from the group consisting of mechanical fasteners, welding, and adhesion.

61. The electronics component assembly of claim 58, wherein:

the mounting member has an axis and has a solid central section;

the first retaining connection includes a first angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the first antenna wire is connected to the mounting member through engagement with the first angled portion, the first antenna wire abuts an end of the solid central section; and

the second retaining connection includes a second angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the second antenna wire is connected to the mounting member through engagement with the second angled portion, the second antenna wire abuts an end of the solid central section.

62. The electronics component assembly of claim 58, wherein:

the mounting member is in the shape of a generally solid cylinder, the first retaining connection is a cylindrical cavity that has internal threads, the second retaining connection is a cylindrical cavity that has internal threads;

the first antenna wire has external threads that are engageable with the internal threads of the first retaining connection to connect the first antenna wire to the mounting member; and

the second antenna wire has external threads that are engageable with the internal threads of the second retaining connection to connect the second antenna wire to the mounting member.

63. An electronics component assembly of claim 58, wherein:

the mounting member is in the shape of a generally solid cylinder, the first retaining connection is a cylindrical cavity that has an annular recess, the second retaining connection is a cylindrical cavity that has an annular recess;

the first antenna wire has an annular projection engageable with the annular recess of the first retaining connection;

the second antenna wire has an annular projection engageable with the annular recess of the second retaining connection;

the first retaining connection is urged around the first antenna wire to help connect the first antenna wire to the mounting member; and

the second retaining connection is urged around the second antenna wire to help connect the second antenna wire to the mounting member.

64. The electronics component assembly of claim 58, further comprising:

a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit;

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into electrical communication with the integrated circuit; and

wherein the mounting member has a flat portion onto which the integrated circuit is mounted.

65. The electronics component assembly of claim 58, further comprising a cover that protects the integrated circuit.

66. The electronics component assembly of claim 58, wherein:

the mounting member has an axis and is generally tubular in shape;

the first retaining connection includes a first angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the first antenna wire is connected to the mounting member through engagement with the first angled portion;

the second retaining connection includes a second angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the second antenna wire is connected to the mounting member through engagement with the second angled portion;

the mounting member includes a first stop that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the first antenna wire abuts the first stop; and

the mounting member includes a second stop that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the second antenna wire abuts the second stop.

67. The electronics component assembly of claim 66, wherein the first and second angled portions are at an angle of 45 degrees towards the axis of the mounting member, and wherein the first and second stops are at an angle of 90 degrees towards the axis of the mounting member.

68. An electronics component assembly in a tire comprising:
a tire;

a mounting member incorporated in the tire, the mounting member is generally tubular in shape with a solid central section and an axis, the mounting member has a flat portion on the solid central section, the mounting member includes a first retaining connection that has a first angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member, the mounting member includes a second retaining connection that is a second angled portion that is a portion of the wall of the mounting member that is angled towards the axis of the mounting member;

a first antenna wire incorporated in the tire, the first antenna wire is connected to the mounting member through engagement with the first angled portion of the first retaining connection;

a second antenna wire incorporated in the tire, the second antenna wire is connected to the mounting member through engagement with the second angled portion of the second retaining connection;

an integrated circuit mounted on the flat portion of the solid central section of the mounting member;

a first mounting member wire connected to the first antenna wire and the integrated circuit for placing the first antenna wire into electrical communication with the integrated circuit;

a second mounting member wire connected to the second antenna wire and the integrated circuit for placing the second antenna wire into electrical communication with the integrated circuit; and

a cover that protects the integrated circuit, the first mounting member wire, and the second mounting member wire.